



**SAWTOOTH FISH HATCHERY  
and  
EAST FORK SATELLITE**

**1998 Spring Chinook Brood Year Report  
1999 Steelhead Brood Year Report**



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## 1998 SPRING CHINOOK SALMON

### ABSTRACT

The Sawtooth Fish Hatchery trap and weir were put into operation on June 10, 1998 and operated through September 14, 1998. A total of 153 spring chinook salmon *Oncorhynchus tshawytscha* (72 males, 77 females, and 4 jacks) were trapped. Released above the weir were 92 fish, (39 unmarked and 4 marked males, 42 unmarked and five marked females, two unmarked and no marked jacks) to spawn naturally. There were seven prespawning mortalities.

Spawning began on August 7, and continued through September 9, with nine spawning days. We spawned 27 females, 25 males, and two jacks that produced 139,469 green eggs (5,165 eggs per female), which yielded 129,593 eyed eggs for an eye-up rate of 93%. From these eyed eggs, 127,064 fry were ponded which resulted in a smolt release of 123,425 smolts.

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## **INTRODUCTION**

### **Funding Source**

Sawtooth Fish Hatchery is part of the Lower Snake River Compensation Plan (LSRCP) and has been in operation since 1985. The hatchery and satellite facility were built by the U.S. Army Corp of Engineers (USACE) and is funded through the U.S. Fish & Wildlife Service (USFWS).

### **Location**

Sawtooth Fish Hatchery is located five miles south of Stanley, Idaho. The facility's 71 acres borders the Salmon River to the west, Highway 75 to the east and USFWS ground to the south and north. The Sawtooth Fish Hatchery weir is approximately 400 miles from Lower Granite Dam and 950 miles from the mouth of the Columbia River. Chinook salmon are released directly into the river at the hatchery and above the hatchery in the headwaters of the Salmon. Sawtooth Fish Hatchery steelhead are released at the hatchery, along the lower Salmon, and various other drainages around the state.

Sawtooth Fish Hatchery has operated a satellite facility on the East Fork of the Salmon River since 1984. The facility is situated eighteen miles upstream on the East Fork Salmon River. The mouth of the East Fork Salmon River is located 42 miles downriver from Sawtooth Fish Hatchery. The property was purchased from the Bureau of Land Management (BLM) and is surrounded by private land. An access road easement was purchased from a private landowner who has property surrounding the location. The east side of the property borders the East Fork of the Salmon River. Historically, all East Fork fish have been returned to the East Fork River.

### **Species Reared**

Sawtooth Fish Hatchery is involved in trapping, spawning, and rearing spring chinook salmon to the smolt stage for release. A-run steelhead trout are also trapped and spawned. The steelhead eggs are incubated to eye-up then transferred to other hatcheries for rearing.

The East Fork facility handles spring chinook salmon as well as B-run steelhead trout. The green eggs from fish spawned at the East Fork station are transferred to Sawtooth Fish Hatchery for incubating. The chinook are reared at Sawtooth Fish Hatchery with the steelhead being transferred as eyed eggs to other hatcheries for rearing.

### **Broodstock History**

Historically, all of the Sawtooth Fish Hatchery and the East Fork trap broodstock have come from the upper Salmon River and the East Fork River respectively. There was some

introduction of Rapid River stock at the Sawtooth Fish Hatchery site and in the headwaters of the Salmon River in the late 1970's and early 1980's as fry and smolt plants.

At both facilities, returning adult fish are released to spawn naturally. Numbers of fish released depends on marked and unmarked fish returns. The National Marine Fisheries Service (NMDS) under permits # 919 and # 920 prescribes fish handling for chinook salmon. All unmarked steelhead are released along with enough marked hatchery fish to ensure pairing of adults. At the East Fork, all salmon are released until a total of twenty pairs have been passed above the weir. All unmarked steelhead are released along with enough marked hatchery fish to ensure equal adult pairings. A historical synopsis of releases and returns is shown in Appendix A and Appendix A.1.

## **OBJECTIVES**

### **Mitigation Goals**

As part of the LSRCP, Sawtooth Fish Hatchery's mitigation goals are expressed in adult returns 19,000 adult salmon over Lower Granite Dam.

### **Idaho Department of Fish and Game Objectives**

Idaho Department of Fish and Game (Department) objectives are:

1. To produce 2.4 million smolts for release, of which up to one million of the East Fork-origin smolts will be returned to the East Fork of the Salmon River.
2. Produce quality fish for supplementation programs.
3. Implement research programs at the hatchery to improve returns to the hatchery.

## **FACILITY DESCRIPTION**

### **Hatchery Description**

The hatchery's main building is 134-ft by 166-ft and consists of an office, meeting room, lab, visitor/interpretive center, wood shop, welding/fabrication shop, intake collection box/chemical room, shop office, incubation and early rearing room, one inside storage room and two outside covered storage areas, generator room, furnace room and a feed freezer/chemical equipment room. The hatchery has four pump houses (each is 14-ft x 11-ft). One is for domestic water and three are production wells. An intake building (15-ft x 37-ft) is located one-half mile upstream from the hatchery and Salmon River water is collected for outside production rearing.

The temporary employee dorm and adult spawning facility are located 300 yards downstream of the hatchery building. The dorm (38-ft x 72-ft) has three bedrooms with a bath in each, attached public rest-room facilities, storage and laundry room, living and dining room with an open kitchen. The adult facility consists of three adult ponds and an enclosed spawning shed (35 ft x 52 ft). There are five resident houses at Sawtooth, all about 1,360 square feet (sq ft) with attached single car garages and separate woodsheds.

The East Fork has a roof structure over a 28-ft travel trailer that is used as a residence while the trap is in operation. The other building is a combination shop, storage and spawning shed (22-ft x 44-ft).

### **Production Capabilities**

Production capacities at the East Fork trap consists of two 68-ft x 10-ft x 4.5-ft adult holding ponds (3,060 cubic ft [cu ft]) and a 10-ft x 17-ft fish trap. No fish are reared at this facility. All green eggs are shipped to Sawtooth Fish Hatchery.

Production capacities for Sawtooth Fish Hatchery include 100 stacks of Flex-a-lite Consolidated Inc. (FAL) incubators containing 800 trays with the potential to incubate five million chinook eggs or seven million steelhead eggs. Inside rearing consists of sixteen semi-square tanks with an individual volume of 17 cu ft and a capacity of 15,000 swim-up fry each, 6 inside rearing tanks with an individual volume of 50 cu ft and a capacity for 30,000 fry each, and 13 inside rearing vats with an individual volume of 391 cu ft and a capacity for 100,000 fry each. Outside rearing consists of 12 fry raceways each with 750 cu ft of rearing space and 28 production raceways each with 2,700 cu ft of rearing space. Each production raceway has a capacity to raise 100,000 chinook to smolt stage for a total capacity of 2.8 million fish. These production raceways are serial re-use that flow from an upper raceway to a lower one.

The adult facility has three concrete adult fish holding ponds with 4,500 cu ft of holding area. Each pond can hold approximately 1,300 adults.

### **RECOMMENDATIONS**

Recommendations for Sawtooth Fish Hatchery include developing additional wells for disease-free rearing water, modifying the river water intake to reduce winter icing problems, repairing gabions at the weir and intake, covering raceway tail-race openings with grating for added safety, installing fence around outside raceways for predator control, and seal coating hatchery roadways.

East Fork recommendations include modifying the intake screen to exclude fish fry, modifying the velocity barrier to prevent injury to migrating fish, and develop a removal system for debris that accumulates on the weir.



## **WATER SUPPLY**

### **Source**

Sawtooth Fish Hatchery receives fish culture water from the Salmon River and two production wells. Rearing water from the river enters an intake structure located one-half mile upstream from the hatchery building, and flows through a 54-inch pipe to a control box located in the hatchery building for final screening. This water is then distributed to the indoor vats, outside raceways or adult fish facility. Incubation and early-rearing water is provided by two production wells. Excess well water is spilled into the control box for use in the outside raceways. A third well provides tempering water introduced at the river intake to reduce winter icing problems.

The East Fork trapping site receives water from the East Fork of the Salmon River via gravity-flow piping throughout the holding ponds. A well provides domestic water, and pathogen-free water, for spawning and egg hardening. No fish are reared at the East Fork trap.

### **Quantity and Temperature**

The Sawtooth Fish Hatchery wells provide 3.1 cubic feet per second (cfs) of pumped water and temperatures range from 39°F (4°C) in the winter to 52°F (11°C) in the summer. The Salmon River provides up to 55 cfs of gravity-flow water and ranges in temperature from 3°F (0°C) in the winter to 68°F (20°C) in the summer.

### **Water Quality**

The most recent water quality analysis from the Sawtooth Fish Hatchery collection box at the river, well #1, and well #2 was completed in October 1999. Results are shown in Appendix B.

## **STAFFING**

Five permanent personnel are stationed at Sawtooth Fish Hatchery: a Hatchery Manager II; an Assistant Hatchery Manager; a Utility Craftsman; and two Fish Culturists.

The temporary employee staffing includes; 8 months of Fishery Technician time, 42 months of Biological Aide time, and 27 months of Laborer time.

## **FISH HEALTH**

### **Diseases Encountered and Treatment**

No major disease outbreaks were encountered with any of the BY98 spring chinook salmon raised at Sawtooth Fish Hatchery. Bacterial Kidney Disease (BKD) was found in low levels in all raceways by October 1999. Raceway 5 (High BKD segregation group) was experiencing elevated mortalities due to BKD. In addition to the two routine prophylactic treatments of erythromycin-medicated feed, another treatment of erythromycin-medicated feed and a 10g/100 # OTC medicated feed was applied through the Western Regional Investigational New Animal Drug (INAD) 9332. Mortalities in the High BKD segregation group were controlled but not eliminated. The other raceways did not seem to have a problem with Renibacterium by pre-liberation.

Acute losses were not experienced at Sawtooth Fish Hatchery due to etiologic agents. The losses experienced at this facility from Renibacterium would best be described as chronic (10-20 fish/day). Antibiotic treatments were successful in controlling mortalities.

Prior to 1999, BKD in Department hatcheries was limited to High BKD segregation groups. In 1996 segregation break-off points were changed. The High BKD segregation point was previously at an optical density (OD) of 0.25 was then changed to 0.4 OD. This elevation in acceptable risk was enough to allow Renibacterium to get started in the chinook culture raceways at this facility. Pahsimeroi Summer Chinook, which were early reared at this facility, did not experience a BKD epizootic.

## **FISH PRODUCTION**

### **Spring Chinook Adult Collection**

The Sawtooth Fish Hatchery chinook-trapping season began on June 10, 1998, and continued through September 14, 1998. The peak of the run occurred the week of July 19, 1998 (Appendix D). A total of 153 spring chinook salmon were trapped including 72 males, 77 females, and four jacks (Appendices E, E.1). Released above the weir were 92 salmon (including 39 unmarked and four marked males, 42 unmarked and five marked females, and two unmarked and no marked jacks) (Appendix F). There were no CWT fish recoveries (Appendix G). One PIT-tagged adult chinook was trapped. It was a 70-cm marked male (tag # 221E1A7829). Sawtooth Fish Hatchery had a male:female ratio of 49.6% male and 50.4% female.

The East Fork trap was not in operation in 1998.

A total of four 3-year old, 33 4-year old, and 116 5-year old fish returned to Sawtooth Fish Hatchery.

### **Adult Treatments**

Sawtooth Fish Hatchery adult chinook were injected with erythromycin phosphate at a rate of 20 mg active per kg. body weight. Injections were given posterior to the pelvic fins in the peritoneal cavity. The Sawtooth Fish Hatchery ponded adults were treated three times per week in a one-hour 170-ppm formalin flush. No adults were ponded at the East Fork.

### **Prespawning Mortality**

Sawtooth Fish Hatchery had 7 prespawning mortalities: four males (two marked) three females (all unmarked).

### **Spawning Operations**

Spawning activities at Sawtooth Fish Hatchery began August 13, and concluded September 9, 1998. The eight egg takes during this period yielded 139,469 green eggs from 27 females for an average fecundity of 5,165 eggs per female. There were 25 male and two jack salmon used for fertilization. Each female's eggs were separated into two groups. Each group was fertilized by sperm from one male (Appendix H). The two groups were then recombined and water hardened for one hour in a 100-ppm titrateable iodine solution. The eggs were then put into Heath incubator trays, with one female per tray for BKD segregation.

### **Incubation**

Each eight-tray Heath stack had flows set at 5 gpm of well water. Eggs were put away at one female per tray for BKD segregation. This averaged 5,165 eggs per tray. All incubated green eggs were treated with a 1,667 ppm formalin bath for 15 minutes starting three days after fertilization at five times per week for fungal control.

Well temperatures ranged from 50°F to 43°F during the incubation period. The eggs eyed-up at 500-Fahrenheit thermal units (FTU). At eye-up the eggs were shocked by pouring them from one container to another. They were then picked and enumerated by hand count. The eggs are shocked at 530 FTU and hatch at 1,300 FTU.

In addition to the BY98 Sawtooth eggs, the hatchery incubated 74,105 green Pahsimeroi Summer Chinook eggs.

Sawtooth Fish Hatchery green eggs eyed-up at a 93% rate, yielding 129,593 eyed eggs (Appendix J).

Pahsimeroi green eggs eyed-up at a 80% rate, yielding 59,014 eyed eggs.

### **Early Rearing**

The Sawtooth Fish Hatchery stock swim-up fry were transferred from the Heath trays to semi-square tanks measuring 42-in x 42-in x 17-in, which were plumbed into existing vat wellwater supply. The swim-up fry were kept at a high density during feed training (1.2 lbs./cu ft) until all the fish were on feed segregated by BKD designation. After all the fish were eating well, they were combined and transferred to an inside vat. The vat contained PVC baffles every four feet. Starting flows for the swim-up fry were set at 3 gallons per minute (gpm) in each semi-square tank and then 20 gpm per vat. As the fish grew, the flows were increased to a maximum of 110 gpm. Early rearing well water varied in temperature from 46°F to 40°F (Appendix I).

All fry were started on Rangen soft moist starter and 1/32, and initially fed by hand. Feed amounts and sizes varied according to manufacturer recommendations as the fish grew. Automatic belt feeders were used once the fry exhibited a good feed response. All fish were fed a 28-day prophylactic treatment of erythromycin-medicated feed during May, at a rate of 4.5 grams active/100 lbs of fish. The fish were transferred outside for final rearing in June and July.

### **Final Rearing**

The Sawtooth spring chinook were placed into the upper sections of five large raceways. Initial densities were 0.03 lbs./cu ft, and water flows were 660 gpm. Two raceways were set up as NATURES Raceways for a natural rearing experiment. The raceways contained camouflage netting to simulate under-cut banks, bottoms painted with six colors to simulate the natural stream bottoms, and suspended trees used to simulate cover. Scientific research done in the past indicates that hatchery smolts may perform better if exposed to some type of natural rearing. One raceway contained progeny from High BKD parent fish.

All outside fish were fed Rangen soft moist grower feed. A second 28-day prophylactic erythromycin-medicated feed treatment was fed in September and October of 1999. It was administered at a rate of 4.5 grams active per 100 lbs of fish, to prevent the onset of BKD. A third treatment was given to High BKD fish in March of 2000.

The finish weight of the BY98 Sawtooth chinook smolts was 7,504 pounds. The fish were fed 9,502 pounds of feed for a conversion rate of 1.26. A synopsis of feeding regimes can be found in Appendix I.1.

### **Fish Marking**

Fish marking occurred the week of September 12, 1999. All fish received coded wire tags (CWT) only, on September 14-18, 1999. In addition, 1,000 fish were tagged with Passive Integrated Transponders (PIT) in March. The PIT tags were used to evaluate downriver migration (Appendices K, L).

## **Fish Distribution**

Fish release for Sawtooth stock BY98 smolts occurred on April 12 and April 19, 2000. On April 12 a total of 106,765 fish were released. On April 19 a total of 16,660 High BKD smolts were released into the Salmon River at the Sawtooth Fish Hatchery weir (Appendix M). Total of the 2000 release was 123,425 smolts. The fish were released in the evening through the outside raceway tailrace pipe. Production costs for BY 98 smolts can be found in Appendix M.1.

### **PAHSIMEROI CHINOOK**

Due to a lack of space and pathogen-free water at Pahsimeroi, Sawtooth Hatchery reared Pahsimeroi Hatchery's BY98 summer chinook. Nine lots of fertilized eggs were brought to Sawtooth Hatchery between August 31 and October 9, 1998. A total of 74,105 eggs were incubated. After dead egg pick off, the number at ponding was 59,014 for an 80% survival from green eggs to ponding.

On May 24, the entire Pahsimeroi group being reared on well water (56,961), were Ad clipped.

All Pahsimeroi fish received a 28-day prophylactic erythromycin-medicated feed treatment beginning on June 1 and ending on June 28, 1998.

On July 27 all fish were moved to the outside raceways. They were 64 fpp and 3.5".

On September 13, 1999, all Pahsimeroi fish were returned to Pahsimeroi Fish Hatchery. The resulting inventory number was a total of 53,920 fish. A total of 1,350 lbs of fish shipped for an average of 40 fpp.

### **SOCKEYE SALMON**

Sawtooth Fish Hatchery received an estimated 49,703 eyed Redfish Lake sockeye eggs from Big Beef (NMFS) and Eagle Fish Hatcheries in three shipments between November 24, 1998 and December 16, 1998. The eggs arrived with approximately 346 Centigrade Temperature Units (CTUs). At 910-950 CTUs fry were ponded into ten semi-square rearing tanks. Initial water flows were set at three gpm.

Eyed egg to ponding survival was 88%, yielding 43,622 fry. All fry were started on #1 Bioproducts Biodiet Starter. Feed size was increased in accordance to Bioproducts recommendation with the exception that 20% of the feed was one size smaller to assure smaller fish would get adequate amounts of feed. As densities reached 4 lbs/gpm, fish were transferred to inside vats. The first transfer was to 50 cuft. semi-square tanks with water flows at eight gpm, then to inside vats with water flows at 100 gpm.

All of the BY98 Redfish Lake sockeye being reared were released in October 1999 as pre-smolts. Redfish Lake received 28,884 fish (1,548 PIT) at 43 fpp on October 13, 1999. Alturas Lake received 12,993 fish (1,548 PIT) at 43 fpp on October 13, 1999. Pettit Lake received 3,427 fish (1,997 PIT) at 43 fpp. Total fall release was 40,304 fish. From egg to pre-smolt the fish had a survival rate of 92%.

## 1999 STEELHEAD TROUT

### ABSTRACT

The Sawtooth Fish Hatchery trap and weir were put into operation on March 23, 1999 and closed May 6, 1999. A total of 933 adult steelhead *Oncorhynchus mykiss* (529 males and 404 females) were trapped at the Sawtooth Fish Hatchery weir. A total of 64 steelhead were released. This included 32 males (three natural), and 32 females (seven natural). Of these released fish, 15 hatchery males and 15 hatchery females were released into a weired-off section of Beaver Creek and 10 males and 10 females were released into Frenchman Creek for a natural-spawning study conducted by Alan Byrne, Department Research Biologist. There were no prespawning mortality at Sawtooth Fish Hatchery.

Spawning began at Sawtooth Fish Hatchery on April 5, 1999 and continued through May 3, 1999 with 9 spawning days. A total of 364 females were spawned with 364 males, yielding 1,526,046 green eggs for an average fecundity of 4,330 eggs per female. These green eggs yielded 1,338,178 eyed-eggs for an eye-up percentage of 87.7%. The eggs were shipped as follows: Hagerman National Fish Hatchery received 846,915, Magic Valley Fish Hatchery received 390,989, and the Shoshone-Bannock Tribe received 100,274.

The East Fork velocity barrier and trap were put into operation April 2, 1999, and ran through May 3, 1999. A total of 56 adult B-run steelhead were trapped. This included 33 males and 23 females. Fish released above the weir to spawn naturally included 11 males (three natural), and seven females (all natural). There was no prespawning mortality.

East Fork spawning operations began on April 6, 1999, and continued through April 27, 1999 with 7 spawning days. A total of 16 females were spawned with 18 males, yielding 62,442 green eggs, for an average fecundity of 3,903 eggs per female. These green eggs yielded 57,954 eyed-eggs for a 92.8% eye-up rate. These eggs were shipped to Magic Valley Hatchery for rearing.

There were 3,962,649 green eggs from Pahsimeroi Hatchery incubated at Sawtooth. These eggs eyed up at an 86.1% rate, yielding 3,412,132 eyed-eggs. The eggs were shipped to the following hatcheries: Magic Valley received 520,074 as eyed eggs, Niagara Springs received 1,717,989 as eyed eggs, and the Shoshone-Bannock Tribes received 825,160 eyed eggs for their streamside incubator program. A total of 349,019 surplus fry were destroyed due to exposure to raw river water and the consequent disease concerns.

The Sawtooth and East Fork stock eyed-eggs were released as smolts during the spring of 1999. A total of 727,068 BY99 Sawtooth stock smolts were released. Sawtooth Fish Hatchery released 606,925 acclimation smolts at the Sawtooth Fish Hatchery weir. Hagerman National Fish Hatchery stocked 120,143 direct release smolts at the Sawtooth Fish Hatchery weir. East Fork stock smolts numbering 51,866 at 3.9 fpp were mixed with Dworshak smolts and released below Squaw Creek Pond.

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## **FISH PRODUCTION**

### **Steelhead Adult Collection**

The Sawtooth Fish Hatchery weir and trap was put into operation on March 23, 1999, and closed May 6, 1999. The East Fork trap was put into operation April 2, 1999, and ran through May 8, 1999. The peak of the Sawtooth Fish Hatchery steelhead *Oncorhynchus mykiss* run occurred during the first week of April and the peak of the East Fork run occurred during the third week of April (Appendix N).

Sawtooth Fish Hatchery trapped a total of 933 adult fish, which included 529 males and 404 females (Appendix O). All fish were scanned for CWT and PIT. Information regarding the CWT fish was not available. Two PIT-tagged adult steelhead were trapped at Sawtooth Fish Hatchery. There was a 61-cm marked male (tag # 2230787E44) and a 60-cm marked female (tag # 22310E7734). A total of 64 steelhead, 32 males (three natural) and 32 females (seven natural) were released (Appendix O.1). Of the released fish, seven males (three natural), and seven females (all natural) were released immediately above the weir. The other adult fish were released as part of supplementation studies conducted by Alan Byrne, Department Research Biologist. These hatchery fish (15 males and 15 females) were placed into a weired-off section of Beaver Creek and 10 males and 10 females were released into Frenchman Creek.

The East Fork facility trapped 56 B-run adult fish, of which 33 were males and 23 were females (Appendix O). A total of 11 males (three natural) and seven females (all natural) were released above the velocity barrier to spawn naturally (Appendix O.1). All fish were scanned for CWT and PIT. Information regarding the CWT fish was not available.

Length frequency distributions of trapped steelhead at Sawtooth and the East Fork are shown in Appendixes P and Q.

Sawtooth Fish Hatchery had a male: female ratio of 57% males and 43% females. The East Fork's male:female ratio was 59% male and 41% female.

Using Kent Ball's (Department Anadromous Researcher) lengths for one- and two-ocean fish, steelhead returns by year-class and sex are shown in Appendix R.

Specific information obtained from CWT fish at both Sawtooth Fish Hatchery and the East Fork facility was not available. However, released steelhead by adult year-class and sex are shown in Appendix S.

### **Adult Treatments**

The returning adults at Sawtooth Fish Hatchery and the East Fork Satellite are not treated or injected with any type of drug or chemicals prior to spawning.

### **Prespawning Mortality**

Sawtooth Fish Hatchery and the East Fork facility had no prespawning mortality.

### **Spawning Operations**

Sawtooth Fish Hatchery spawned steelhead on nine days from April 5 through May 3, 1999. Spawning took place at the East Fork on seven days from April 6, through April 27, 1999.

At Sawtooth, 728 fish were spawned, of which 364 were females. The East Fork facility spawned 34 fish, of which 16 were females. A total of 1,526,046 green eggs were collected from Sawtooth Fish Hatchery fish (4,330 per female) and 62,442 green eggs were taken from East Fork fish (3,903 per female).

After fertilization, the eggs were rinsed of blood and sperm with well water. Then the eggs were water hardened in a minimum 100-ppm solution of Argentine (10% iodine) solution for one hour before being put into heath trays for incubation. All eggs tested negative for virus.

### **Incubation**

After hardening in the Argentine solution, the green eggs were put away at one female's eggs per Heath tray.

There were 3,962,649 green eggs received from 820 females (4,851/female) from Pahsimeroi Hatchery that were incubated at Sawtooth. These eggs were incubated at three females per Heath tray.

All incubated eggs were treated with a 1,667-ppm 15-minute formalin flow-through treatment five times per week for fungal and bacterial control. Sawtooth's eggs eyed up at an 88% rate, yielding 1,338,178 eyed eggs. East Fork eggs eyed up at a 93% rate, yielding 57,954 eyed eggs. Pahsimeroi eggs incubated at Sawtooth Fish Hatchery eyed up at an 86.1% rate, resulting in 3,412,132 eyed eggs.

Well temperatures varied from 40°F at the beginning of incubation to 47°F when the last eyed-eggs were shipped. Ten temperature units (TUs) per day was the average during the incubation period. Eye-up occurred at 360 TUs and the eggs were shocked at 380 TUs.

The eggs were shocked by putting them in a half-full 3-gallon bucket of water, then pouring them into a quarter-full bucket of water from a height of about three feet. One day after shocking, the eggs were machine-picked, using a Jenn-Sorter model JH machine, which picks and enumerates eggs. A day or two after picking, the eyed eggs are handpicked before transfer to the rearing hatcheries. The eggs were loaded at 50,000 to 100,000 eggs per 48-qt cooler of wellwater. Then the cooler was strapped shut and shipped.

We shipped the Sawtooth eggs as follows: 846,915 as eyed eggs to Hagerman National Hatchery, 390,989 to Magic Valley Fish Hatchery, 100,274 eyed eggs to the Shoshone-Bannock Tribe. Magic Valley received 57,954 East Fork eyed eggs.

The Pahsimeroi eggs were shipped as follows: 520,074 as eyed eggs to Magic Valley Hatchery; 1,717,989 as eyed eggs to Niagara Springs Hatchery, 825,160 as eyed eggs to the Shoshone-Bannock Tribe. There were 349,019 surplus Pahsimeroi eggs destroyed due to exposure to raw river water.

### **Release Acclimation of BY 99**

For the ninth year in a row, steelhead smolts were held and acclimated at Sawtooth Fish Hatchery before final release. A total of 607,655 smolts were hauled from Hagerman National Hatchery and held in 10 separate raceways, starting April 10, 2000 and continuing until April 25, 2000. They were held from 1 to 16 days. All of the fish were fed a maintenance diet of Rangen Soft Moist 3/32 totaling 2,728 lbs. The screens were removed on April 26, 2000. The smolts were forced out of the raceways the same day. A total of 606,925 BY99 acclimated smolts were released. An additional 120,143 BY99 smolts were hauled from Hagerman NFH and were released directly below the Sawtooth weir concurrent to the acclimated smolts, bringing the total BY99 smolt release near Sawtooth to 727,068. No fish were released at Torrey's this year. East Fork stock smolts numbering 51,866 at 3.9 fpp were mixed with Dworshak smolts and released below Squaw Creek Pond.

### **Fish Marking**

Fish marking was completed in the rearing hatcheries and is shown in Appendix N.

## **CONCLUSIONS/RECOMMENDATIONS**

### **East Fork Trap**

As stated in last year's brood year report, the East Fork's adult returns are insufficient to meet egg needs or escapement goals. A decision had been made to shift the East Fork program to Squaw Creek Pond.

### **Sawtooth Fish Hatchery**

If the returning number of adults shows that acclimation is a viable program, then we should plan on implementing the program every spring. But if the numbers of adults show that there is no difference or less returning "acclimated" adults, then we need to stop the program. Acclimation requires the hatchery to draw large amounts of water from the river, which also draws in emerging endangered natural chinook fry.

## **APPENDICES**

Appendix A. Sawtooth Fish Hatchery Chinook Smolt Releases and Returns (marked and unmarked).

Brood Year	Release Year	Number Released	Adult Returns <sup>a</sup>				Total %
			3-year	4-year	5-year	Returns	
1979	1981	None	-	-	-	291	inc
1980	1982	None	17	66	165	248	inc
1981	1983	185,375	49	1,182	796	2,027	1.08
1982	1984	230,550	292	922	875	2,086	.91
1983	1985	420,060	51	452	1,318	1,821	.43
1984	1986	347,484	17	86	190	293	.08
1985	1987	1,185,060	80	286	164	530	.05
1986	87-88	1,705,500	412	1,212	297	1,921	.11
1987	88-89	2,092,000	112	201	63	376	.02
1988	89-90	1,895,60	68	496	480	1,044	.055
1989	90-91	652,600	45	78	27	150	.023
1990	91-92	1,273,400	29	63	6	98	.008
1991	92-93	774,583	6	15	28	49	.006
1992	93-94	213,830	16	101	96	213	.099
1993	94-95	334,313	27	148	133	308	.092
1994	1996	25,006	10	33	39	82	.032
1995	1997	4,756	4	78	(2000)	-	inc
1996	1998	43,161	79	(2000)	(2001)	-	inc
1997	1999	223,240	(2002)	(2001)	(2002)		
1998	2000	123,425	(2001)	(2002)	(2003)		

East Fork Chinook Smolt Releases and Returns (marked and unmarked).

Brood Year	Release Year	Number Released	Adult Returns <sup>a</sup>				Total %
			3-year	4-year	5-year	Returns	
1979	1981	-	-	-	69	69	inc
1980	1982	-	-	26	59	85	inc
1981	1983	-	-	193	102	317	inc
1982	1984	-	-	87	181	268	inc
1983	1985	-	22	90	519	631	inc
1984	1986	108,700	1	23	51	75	.06
1985	1987	195,100	6	55	27	88	.045
1986	1988	249,200	22	106	32	160	.064
1987	1989	305,300	12	23	23	58	.019
1988	1990	514,600	7	27	65	99	.019
1989	1991	98,300	15	18	13	46	.046
1990	1992	79,300	6	2	0	8	.010
1991	1993	35,172	0	0	0	0	.000
1992	1994	12,368	0	7	0	7	.056
1993	1995	48,845	3	7	ND	10	.020

<sup>a</sup> Age classes based upon the following lengths: 3-yr. old:  $\leq 64$  cm,  
4-yr. old: 64 to 82 cm 5-yr. old:  $>82$  cm.  
ND means no data, trap not operated.

Appendix A.1 Sawtooth Fish Hatchery Chinook Smolt Releases and Hatchery Returns (marked fish).

Beginning with BY91, all hatchery reserve chinook smolts released were marked.

\*all CWT. no AD clip

**Hatchery Adult Returns**

Brood Year	Release Year	Number Released	Adult Returns <sup>a</sup>				Total %
			3-year	4-year	5-year	Returns	
1991	92-93	774,583	2	11	7	20	.002
1992	93-94	213,830	8	23	26	57	.026
1993	94-95	334,313	21	72	23	116	.035
1994	1996	25,006	1	3	3	7	.028
1995	1997	4,756	0	12	(2000)	-	inc
1996	1998	43,161	60	(2000)	(2001)	-	inc
1997	1999	223,240	(2000)	(2001)	(2002)		
1998	2000	*123,425	(2001)	(2002)	(2003)		

East Fork Chinook Smolt Releases and Hatchery Returns (marked Fish).

**Hatchery Adult Returns**

Brood Year	Release Year	Number Released	Adult Returns <sup>a</sup>				Total %
			3-year	4-year	5-year	Returns	
1991	1993	35,172	0	0	0	0	.000
1992	1994	12,368	0	0	0	0	.000
1993	1995	48,845	1	1	ND	2	.004

<sup>a</sup> Age classes based upon the following lengths: 3-yr. old: ≤ 64 cm, 4-yr. old: 64 to 82 cm 5-yr. old: >82 cm.  
ND means no data, trap not operated.

Appendix B. Sawtooth Fish Hatchery Water Quality Analysis of the Salmon River.

	1999	1996	1993	1985
<b><u>Nutrients (mg/L)</u></b>				
T. Ammonia as N	0.02	0.027	0.043	0.045
T. NO <sub>2</sub> + NO <sub>3</sub> as N	NR	0.006	0.073	0.088
T. Kjeldahl Nitrogen as N	<0.10	0.20	<.05	0.26
T. Phosphorus as P	0.005	<.05	<.05	0.02
Ortho Phosphate as P	<0.005	NR	0.019	<.003
<b><u>Minerals (mg/L)</u></b>				
Sp. Conductance (umhos/cm)	159.0	167	157	135
Hardness as CaCO <sub>3</sub>	75.7	80	68	62
T. Alkalinity as CaCO <sub>3</sub>	75.2	79	74	63
Bicarbonate Alk. as CaCO <sub>3</sub>	75.2	79	74	63
Calcium	26.8	27.4	24	20.8
Magnesium	2.10	2.9	1.9	1.8
Sodium	4.26	5.5	7.0	3.8
Potassium	0.48	0.7	0.7	<1
Fluoride	0.60	0.29	0.85	0.58
Sulphate as SO <sub>4</sub>	5.50	12	5	<6
<b><u>Total Metals (ug/L)</u></b>				
Arsenic, Total	<0.005	<10	<10	<10
Boron, Total	NR	<10	<80	1
Cadmium, Total	<0.0005	<1	<1	<1
Chromium, +6	NR	NR	<10	<50
Chromium, Total	<0.002	<2	<10	<50
Copper, Total	<0.01	<10	<10	<10
Iron, Total	0.02	20	20	120
Lead, Total	<0.002	<5	<5	<50
Manganese, Total	<0.01	1	<10	10
Mercury, Total	<0.0002	<.5	<.5	<.5
Nickel, Total	<0.003	<5	<10	<50
Silver, Total	<0.002	<1	<1	<1
Zinc, Total	<0.001	3	<2	<1
<b><u>Miscellaneous</u></b>				
Turbidity (NTU)	0.98	0.45	<1	1.8
pH (SU)	7.97	8.04	8.0	8.1
Total Cyanide (mg/L)	<0.005	<.005	<.005	<.005
Total Residue	NR	NR	NR	97

## Appendix B.1 Sawtooth Fish Hatchery Water Quality Analysis of Well 1 & 2 Mix

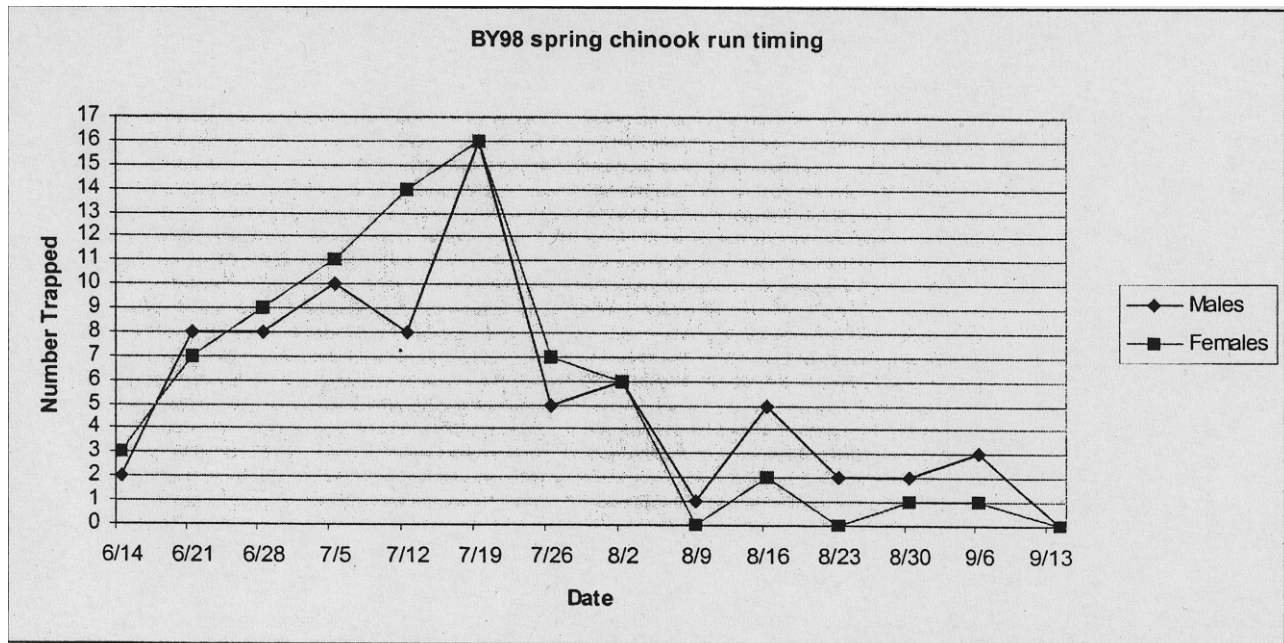
	<b>1999</b>
<b><u>Nutrients (mg/L)</u></b>	
Ammonia as N	0.02
T. Phosphorus as P	7.60
<b><u>Minerals (mg/L)</u></b>	
Hardness	81.3
Alkalinity	85.7
Biocarbonate Alk. as CaCO <sub>3</sub>	85.7
<b><u>Total Metals (ug/L)</u></b>	
Arsenic	<0.005
Cadmium	<0.0005
Chloride	0.56
Cobalt	<0.01
Copper	<0.01
Lead	<0.002
Mercury	<0.0002
Selenium	<0.005
<b><u>Miscellaneous</u></b>	
T. Cyanide (mg/L)	<0.005



Appendix C. Sawtooth Fish Hatchery Results of Disease Sampling.

<b>BY98 Juvenile Chinook</b>			
<b>Case #</b>	<b>Stock</b>	<b>Date</b>	<b>Data</b>
99-030	Saw	02/04/99	BKD 0/10, FUR 0/8, ERM 0/8, CWD 0/8
99-214	Pah	07/06/99	IHN 0/10, IPN 0/10, BKD 0/10, FUR 0/8, ERM 0/8, CWD 0/8
99-219	Pah	07/12/99	IHN 0/5, IPN 0/5, FUR 0/8, ERM 0/8, CW 0/8, Enterbacter
99-235	Saw	07/27/99	BKD 5/6, FUR 0/4, ERM 0/4, CWD 0/4, MAS 4/4
99-423	Saw	11/04/99	BKD 11/11
99-424	Saw	11/04/99	BKD 17/17
00-036	Saw	03/13/00	INH 0/20, IPN 0/20, BKD 5/5, WHD 1/4
<b>Return Year 1998 Chinook Broodstock</b>			
<b>Case #</b>	<b>Stock</b>	<b>Date</b>	<b>Data</b>
98-333	Saw	07/21/98	RS, WHD; VIRO 0/1, ELISA 20/27 (16 LOW, 4 HIGH), WHD 2/5 (x-4-5, DIGEST ONLY), WHD-PCR 2/4
<b>Return year 1999 Steelhead Broodstock</b>			
<b>Case #</b>	<b>Stock</b>	<b>Date</b>	<b>Data</b>
99-082	Saw	04/05/99	IHN 0/12
99-084	EF	04/06/99	IHN 0/1, IPN 0/1
99-087	Saw	04/08/99	IHN 0/12, IPN 0/12
99-099	Saw	04/12/99	IHN 0/23, IPN 0/23
99-100	EF	04/09/99	IHN 0/1, IPN 0/1
99-103	EF	04/13/99	IHN 0/2, IPN 0/2
99-110	Saw	04/15/99	IHN 0/15, IPN 0/15
99-111	EF	04/16/99	IHN 0/1, IPN 0/1
99-116	Saw	04/19/99	IHN 0/29, IPN 0/29
99-117	EF	04/20/99	IHN 0/4, IPN 0/4
99-121	Saw	04/23/99	IHN 0/93, IPN 0/93
99-122	EF	04/23/99	IHN 0/1, IPN 0/1
99-124	Saw	04/25/99	IHN 0/71, IPN 0/71
99-132	Saw	04/29/99	IHN 0/38, IPN 0/38
99-133	EF	04/27/99	IHN 0/2, IPN 0/2
99-150	Saw	05/03/99	IHN 0/6, IPN 0/6
99-153	EF	05/05/99	IHN 0/16, WHD 1/6
99-154	Saw	05/05/99	IHN 0/60, WHD 1/5

Appendix D. Sawtooth Fish Hatchery Spring Chinook Run Timing 1998



Appendix E. Sawtooth Fish Hatchery Age Class Totals from All Trapped Chinook, Return Year 1998.

<b>Sawtooth</b>	<b>Length (Fk)</b>	<b>Year class</b>	<b>Number</b>
Males	≤ 64 cm	3-year old	4
	64-82 cm	4-year old	17
	> 82 cm	5-year old	55
<b>Subtotal</b>			<b>76</b>
Females	≤ 64 cm	3-year old	0
	64-82 cm	4-year old	16
	> 82 cm	5-year old	61
<b>Subtotal</b>			<b>77</b>
<b>Total</b>			<b>153</b>

Appendix E.1. Sawtooth Fish Hatchery Spring Chinook Salmon Length Frequency Distribution for 1999

LENGTH (CM)	MALES					FEMALE					Total Fish
	Hatchery Ponded	Hatchery Released	Natural Ponded	Natural Released	Total Males	Hatchery Ponded	Hatchery Released	Natural Ponded	Natural Released	Total Females	
44					0					0	0
45					0					0	0
46					0					0	0
47					0					0	0
48					0					0	0
49			1	1	2					0	2
50					0					0	0
51					0					0	0
52					0					0	0
53					0					0	0
54					0					0	0
55				1	1					0	1
56					0					0	0
57					0					0	0
58					0					0	0
59					0					0	0
60					0					0	0
61					0					0	0
62					0					0	0
63					0					0	0
64			1		1					0	1
65					0					0	0
66					0					0	0
67					0					0	0
68					0					0	0
69				1	1			1		1	2
70			1	1	2					0	2
71					0					0	0
72				1	1				1	1	2
73			2		2					0	2
74				1	1			1	2	3	4
75					0					0	0
76				1	1			1		1	2
77				2	2				1	1	3
78				1	1	1			2	3	4
79				1	1			2		2	3
80			1	1	2					0	2
81			1		1			1	1	2	3
82	1		1		2	1			1	2	4
83				2	2				1	1	3
84		1		1	2					0	2
85	1				1	1	1			2	3
86	1		2	1	4				1	1	5
87			2	1	3	2	1	2	5	10	13
88				2	2	1		1	7	9	11
89					0			2	3	5	5
90				3	3				2	2	5
91					0	2	1	2	2	7	7
92			1	1	2	1	1	2	4	8	10
93			1	1	2			1	2	3	5
94	1			1	2		1	2	2	5	7
95	1	1			2	1		1		2	4
96			2	1	3				1	1	4
97				2	2					0	2
98	2	1		3	6				1	1	7

Appendix E.1. Continued

99		1		2	3			1	2	3	6
100			1	2	3				1	1	4
101				1	1					0	1
102			1		1					0	1
103				1	1					0	1
104			1	1	2					0	2
105			1		1					0	1
106				1	1					0	1
107			2	1	3					0	3
108			2	1	3					0	3
<b>Totals</b>	<b>7</b>	<b>4</b>	<b>24</b>	<b>41</b>	<b>76</b>	<b>10</b>	<b>5</b>	<b>20</b>	<b>42</b>	<b>77</b>	<b>153</b>

Appendix F. Sawtooth Fish Hatchery Age Class Breakdown by Released Chinook, Return Year 1998

<b>Sawtooth</b>	<b>Length (Fk)</b>	<b>Age Class</b>	<b>Number</b>
Males	≤ 64 cm	3-year old	2
	64-82 cm	4-year old	10
	> 82 cm	5-year old	33
<b>Total Males</b>			<b>45</b>
Females	≤ 82 cm	4-year old	8
	> 82 cm	5-year old	39
<b>Total Females</b>			<b>47</b>
<b>Total released</b>			<b>92</b>

Appendix G. Sawtooth Fish Hatchery Chinook Age Class Breakdown by CWT Recoveries 1998

<b>Sex</b>	<b>Length (cm)</b>	<b>Code</b>	<b>Purpose</b>
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No CWT were recovered from trapped fish in 1998

Appendix H. Sawtooth Fish Hatchery Spring Chinook Spawning Matrix, 1998 return year.

Date Spawned	Female Length	Mark	Male 1 and 2		Length	Mark
			Length	Mark		
8/13/98	91	AD	102	--	105	--
8/13/98	91	--	100	AD	98	AD
8/13/98	85	AD/LV	86	--	105	--
8/17/98	91	AD	86	--	107	--
8/17/98	92	AD	102	--	**	--
8/17/98	81	--	98	AD	87	--
8/20/98	89	--	95	AD	94	AD
8/20/98	89	--	100	AD	86	AD
8/24/98	95	AD	80	--	93	--
8/24/98	69	--	94	AD	104	--
8/24/98	74	--	49	--	95	AD
8/27/98	91	--	73	--	49	--
8/27/98	93	--	64	--	78	--
8/27/98	86	AD	107	--	96	--
8/27/98	92	--	86	AD	64	--
8/27/98	94	--	70	--	74	--
8/27/98	78	AD	108	--	81	--
8/27/98	79	--	96	--	104	--
8/31/98	87	--	73	--	70	--
8/31/98	97	--	72	--	80	--
8/31/98	76	--	96	--	100	--
8/31/98	86	AD	96	--	107	--
8/31/98	95	--	49	--	74	--
8/31/98	88	AD	107	--	86	--
8/31/98	88	--	87	--	108	--
9/01/98	82	AD	96	--	87	--
9/09/98	94	--	82	--	82	AD

\*\* Only one male used on this female

Appendix I. Survival Table for Chinook (BY98) and Steelhead (BY99) from Green Eggs to Released Smolts, at Sawtooth Fish Hatchery and East Fork Sites.

<b>CHINOOK</b>				
Green egg Number	Eyed egg Number	Percent Survival	Released Smolts	Percent Survival From green
<b><u>Sawtooth Fish Hatchery Fish</u></b>				
139,469	129,593	93	123,425	88
<b>STEELHEAD</b>				
Green egg Number	Eyed egg Number	Percent Survival	Released Smolts	Percent Survival From green
<b><u>Sawtooth Fish Hatchery Fish</u></b>				
1,526,046	1,338,178	87.7	distributed as follows	
	1,237,904 for smolt production		1,042,068	84
	100,274 for egg boxes		N/A	N/A
<b><u>East Fork Fish</u></b>				
62,442	57,954	92.8	51,866	83

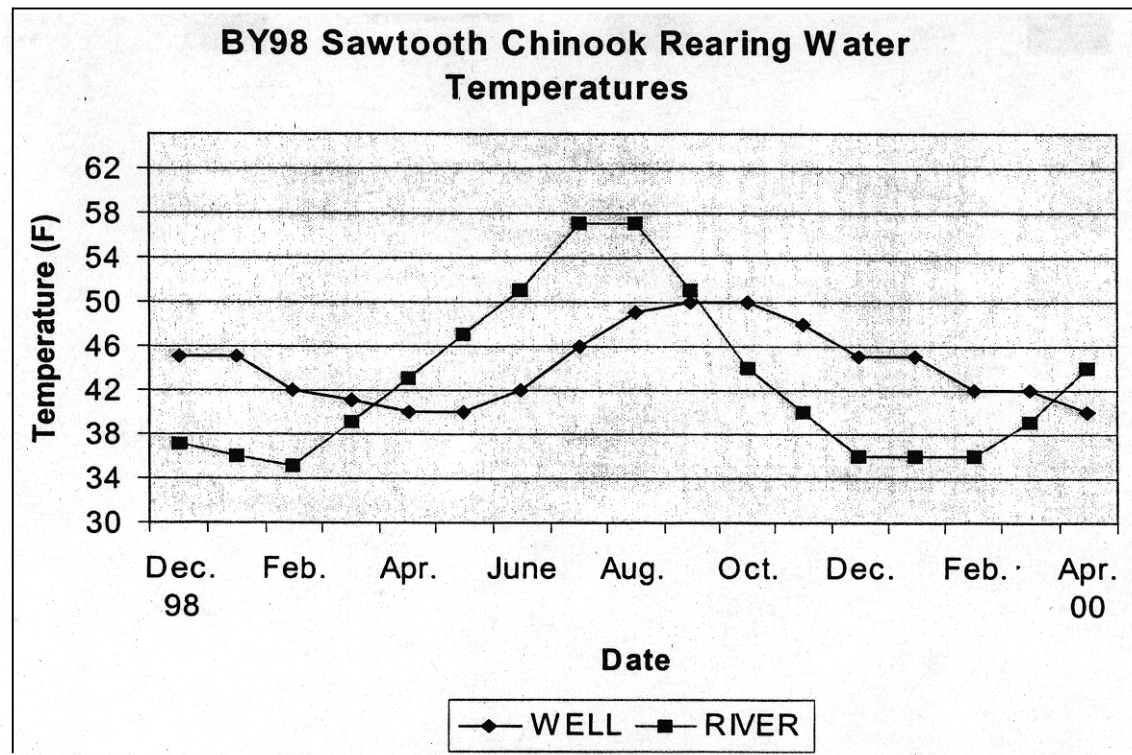
N/A = Fish numbers resulting from these eyed eggs is unknown.  
All steelhead raised at other hatcheries.



Appendix I.1. Feed Schedule for Sawtooth/Pahsimeroi Spring Chinook, BY98.

Fpp	% BW Fed	Feed Size	Timing
su-----800	.035	str., 1/32	11/98 - 01/16/98
800---500	.033	1/32	01/99 - 02/99
500---400	.025	3/64	02/99 - 03/99
400---350	.025	3/64	03/99 - 04/99
350---300	.023	3/64	04/99 - 04/99
300---250	.022	3/64	05/99 - 06/99
250---150	.024	3/64, 1/16	06/99 - 06/99
150---110	.024	1/16	06/99 - 07/99
110----90	.025	1/16	07/99 - 08/99
90-----50	.022	1/16, 3/32	08/99 - 09/99
50-----17	.020	3/32	09/99 - 10/99
≤ -----17	Maintenance	3/32	10/99 - release 4/18/00

Appendix J. Rearing Water Temperatures, BY98 Spring Chinook at Sawtooth Fish Hatchery.



Appendix K. Summary of Marked Spring Chinook Released, Return Year 1998.

<b>Sawtooth Fish Hatchery Stock</b>		
<b>Mark</b>	<b>Number Released</b>	<b>Location</b>
CWT only	106,765	Sawtooth Fish Hatchery Weir, 04/12/00 (supplementation) non BKD
CWT only	16,660	High BKD, Sawtooth Weir, 04/19/00 (supplementation)
<b>Total Release (PIT)</b>	<b>123,425 (992)</b>	

<b>Pahsimeroi Stock</b>		
Adipose Clip	53,920	Transferred to Pahsimeroi FH 9/13/1999

Appendix L. Summary of Sawtooth Fish Hatchery Spring Chinook Smolt Releases, Return Year 1998

<b>Raceway</b>	<b>Number</b>	<b>Fish per Pound</b>	<b>Pounds</b>	<b>Designation</b>
1	25,683	16	1,603	Supplementation Control
2	22,095	14	1,574	Supplementation NATURES
3	30,942	17	1,825	Supplementation Control
4	28,045	18.6	1,510	Supplementation NATURES
5	16,660	17	992	Supplementation High BKD
<b>Total</b>	<b>123,425</b>			

Appendix M. Sawtooth Fish Hatchery Summary of Smolt Releases and Marks.

<b>Steelhead Sawtooth Fish Hatchery Stock BY99</b>					
<b>Mark Type</b>	<b>CWT Code</b>	<b>#PIT</b>	<b># Fish Released</b>	<b>Date</b>	<b>Release Purpose</b>
AD	none	none	484,454	04/26/00	Acclimated, contribution
AD	10-55, 19, 20, 21, 22, 23, 24	**	122,471	04/26/00	Acclimated, contribution
AD	10-55, 16, 17, 18, 25, 26, 27	**	120,143	4/26/00	Direct Release at SFH weir, contribution
<b>TOTAL</b>			<b>727,068</b>		

\*\* Number PIT tagged available from IDFG, marking supervisor

<b>Steelhead East Fork Stock BY99</b>					
<b>Mark Type</b>	<b>CWT Code</b>	<b>#PIT</b>	<b># Fish Released</b>	<b>Date</b>	<b>Release Purpose</b>
AD			51,866	4/20-24/00	contribution, Squaw Creek Pond

<b>Chinook Sawtooth Fish Hatchery BY98</b>					
<b>Mark Type</b>	<b>CWT Code</b>	<b>#PIT</b>	<b># Fish Released</b>	<b>Date</b>	<b>Release Purpose</b>
CWT	N/A	992	106,765	04/12/00	Supplementation, ½ Natures, Non BKD.
CWT	N/A	----	16,660	04/19/00	Supplementation, High BKD
<b>Total</b>			<b>123,425</b>	All released at Sawtooth FH Weir	

N/A = cwt codes are available at IDFG Nampa Fish Research, Natures Study.

Appendix M.1. Sawtooth Fish Hatchery Production Cost Table (Includes Chinook BY98, Steelhead BY00, and Sockeye BY 99).

Chinook BY 98							
Smolt Number	Lbs. Feed	Cost Feed	Lbs of Smolts	C	Total Cost	Cost per 1,000	Cost per lb.
<b>Sawtooth</b>							
123,425	9,502	\$10,551.47	7,504	1.26	\$35,852	\$1,100.90	\$18.10
<b>Pahsimeroi</b>							
53,920	1,651	\$1,688.31	1,350	1.22	\$58,222	\$1,080.18	\$43.12

**East Fork**

No BY98 East Fork spring chinook salmon were reared. Costs were incurred operating the trap.

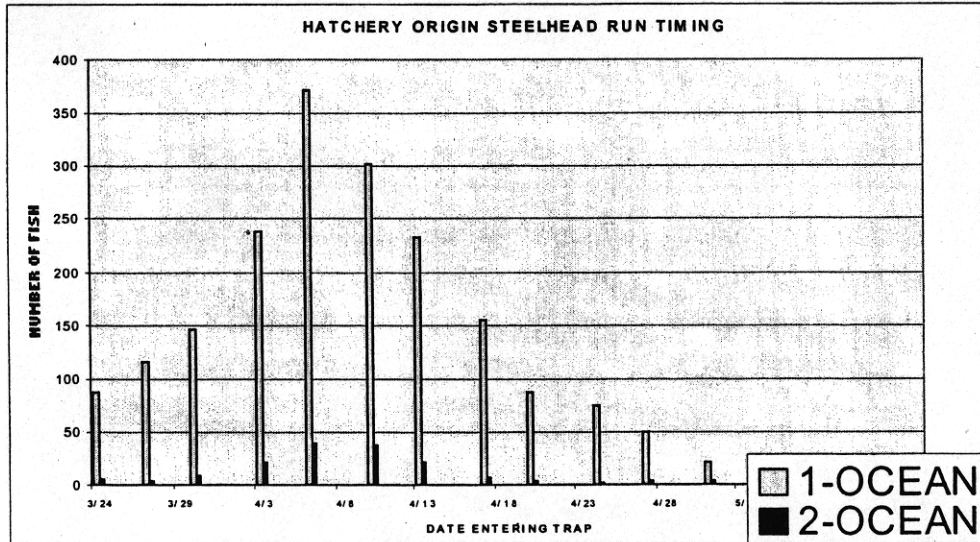
Steelhead BY 99				
Stock	Green Eggs	Eyed Eggs	Cost	Total eyed eggs Cost per 1,000
<b>Sawtooth</b>	1,526,046	1,338,178	\$,60,041	\$ 44.87
<b>East Fork</b>	62,442	57,954	\$,32,750	\$565.63
<b>Pahsimeroi</b>	3,962,649	3,412,132	\$,16,375	\$ 4.79
<b>Totals</b>	5,551,137	4,808,264	\$109,166	\$615.29

Sockeye BY 98				
Smolt Number	Lbs Smolts	Total Cost	Cost per 1,000	Cost per lb.
40,304	937	101,080	2,508	107.87

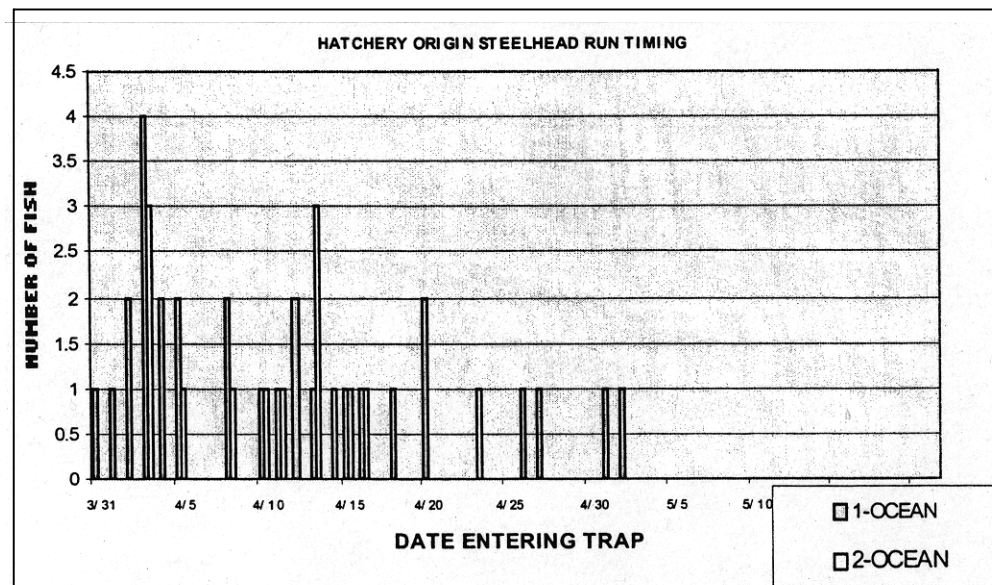
Note: Total costs less capital outlay. Costs include operating East Fork fish trap and running wells for entire rearing period. Costs are proportional species and stock.

Appendix N. Run Timing for Steelhead, Return Year 1999, Sawtooth and East Fork traps.

### 1999 SAWTOOTH FISH HATCHERY STEELHEAD RUN TIMING HATCHERY ORIGIN STEELHEAD



### 1999 EAST FORK STEELHEAD RUN TIMING HATCHERY ORIGIN STEELHEAD



Appendix O. Steelhead Returns by Year Class<sup>1</sup> and Sex, Return Year 1999.

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**Sawtooth Fish Hatchery**

2-year old males		474 (1 natural)
3 or 4-year old males		<u>55 (2 natural)</u>
	<b>males</b>	529 (3 natural)
2-year old females		318 (3 natural)
3 or 4 year old females		<u>86 (4 natural)</u>
	<b>females</b>	404 (7 natural)

**East Fork**

2-year old males	-	29 (1 natural)
3 or 4-year old males	-	<u>4 (2 natural)</u>
	<b>males</b>	33 (3 natural)
2-year old females		11 (1 natural)
3 or 4 year old females-		<u>12 (6 natural)</u>
	<b>females</b>	23 (7 natural)

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<sup>1</sup>These figures are based on Kent Ball's criteria for aging steelhead, as described in Appendix U.

Appendix O.1. Lengths of Released Steelhead, Return Year 1999, from Sawtooth Fish Hatchery, and East Fork Traps.

Sawtooth:				East Fork:			
Fork Len. (cm)	Male	Female	Total	Fork Len. (cm)	Male	Female	Total
54	1	0	1	60	0	(1n)	1(1n)
55	0	2	2	61	1	0	1
56	3	2	5	62	3	0	3
57	2	6(1n)	8(1n)	63	1	0	1
58	4	7(1n)	11(1n)	64	(1n)	0	1(1n)
59	2	5	7	65	1	0	1
60	2	0	2	66	1	0	1
61	3	1	4	73	(1n)	(1n)	2(2n)
62	3	2(1n)	5(1n)	74	0	(2n)	2(2n)
63	1	1	2	75	0	(1n)	1(1n)
65	5 (1n)	0	5(1n)	77	0	(1n)	1(1n)
66	0	0	1	78	(1n)	0	1(1n)
69	0	1	1	79	1	0	1
70	1	(1n)	2(1n)	82	0	(1n)	1(1n)
72	0	(1n)	(1n)				
73	0	(2n)	(2n)				
75	(1n)	0	(1n)				
76	1	0	1				
78	1	0	1				
81	(1n)	0	(1n)				
Totals:	32(3n)	32(7n)	64(10n)	Totals:	11(3n)	7(7n)	18(10n)

(#) indicates number of unmarked fish in each length group.



Appendix P. Sawtooth Fish Hatchery Steelhead Length Frequency Distribution, Return Year 1999.

Sawtooth Hatchery 2000 Adult Steelhead Run

FK.LN (CMS)	HATCHERY		NATURAL			TOTAL TRAPPED			FK.LN (in)
	MALES	FEMALES	MALES	FEMALES		MALES	FEMALES	TOTAL	
50	1	0	0	0		1	0	1	19.7
51	3	1	0	0		3	1	4	20.1
52	1	0	0	0		1	0	1	20.5
53	3	2	0	0		3	2	5	20.9
54	8	3	0	0		8	3	11	21.3
55	15	9	0	0		15	9	24	21.7
56	16	21	0	0		16	21	37	22.0
57	16	40	0	1		16	41	57	22.4
58	55	58	0	1		55	59	114	22.8
59	54	54	0	0		54	54	108	23.2
60	71	42	0	0		71	42	113	23.6
61	72	38	0	0		72	38	110	24.0
62	60	19	0	1		60	20	80	24.4
63	39	15	0	0		39	15	54	24.8
64	26	9	0	0		26	9	35	25.2
65	12	4	1	0		13	4	17	25.6
66	12	7	0	0		12	7	19	26.0
67	9	3	0	0		9	3	12	26.4
68	4	13	0	0		4	13	17	26.8
69	9	12	0	0		9	12	21	27.2
70	7	14	0	1		7	15	22	27.6
71	10	9	0	0		10	9	19	28.0
72	9	10	0	1		9	11	20	28.3
73	1	4	0	2		1	6	7	28.7
74	2	3	0	0		2	3	5	29.1
75	3	5	1	0		4	5	9	29.5
76	3	0	0	0		3	0	3	29.9
77	1	2	0	0		1	2	3	30.3
78	3	0	0	0		3	0	3	30.7
79	1	0	0	0		1	0	1	31.1
80	0	0	0	0		0	0	0	31.5
81	0	0	1	0		1	0	1	31.9
82	0	0	0	0		0	0	0	32.3
83	0	0	0	0		0	0	0	32.7
84	0	0	0	0		0	0	0	33.1
85	0	0	0	0		0	0	0	33.5
86	0	0	0	0		0	0	0	33.9
87	0	0	0	0		0	0	0	34.3
TOTALS:	526	397	3	7		529	404	933	

# Appendix Q. East Fork Steelhead Length Frequency Distribution, Return Year 1999.

East Fork 2000 Adult Steelhead Run

FK.LN (CMS)	HATCHERY		NATURAL			TOTAL TRAPPED			FK.LN (in)
	MALES	FEMALES	MALES	FEMALES		MALES	FEMALES	TOTAL	
50	0	0	0	0		0	0	0	19.7
51	0	0	0	0		0	0	0	20.1
52	0	0	0	0		0	0	0	20.5
53	0	0	0	0		0	0	0	20.9
54	0	0	0	0		0	0	0	21.3
55	1	0	0	0		1	0	1	21.7
56	0	1	0	0		0	1	1	22.0
57	1	0	0	0		1	0	1	22.4
58	3	0	0	0		3	0	3	22.8
59	1	0	0	0		1	0	1	23.2
60	3	3	0	1		3	4	7	23.6
61	4	3	0	0		4	3	7	24.0
62	4	1	0	0		4	1	5	24.4
63	3	2	0	0		3	2	5	24.8
64	4	0	1	0		5	0	5	25.2
65	1	0	0	0		1	0	1	25.6
66	2	0	0	0		2	0	2	26.0
67	1	0	0	0		1	0	1	26.4
68	0	0	0	0		0	0	0	26.8
69	0	0	0	0		0	0	0	27.2
70	0	1	0	0		0	1	1	27.6
71	0	0	0	0		0	0	0	28.0
72	0	0	0	0		0	0	0	28.3
73	0	2	1	1		1	3	4	28.7
74	1	0	0	2		1	2	3	29.1
75	0	1	0	0		0	1	1	29.5
76	0	1	0	1		0	2	2	29.9
77	0	0	0	1		0	1	1	30.3
78	0	1	1	0		1	1	2	30.7
79	1	0	0	0		1	0	1	31.1
80	0	0	0	0		0	0	0	31.5
81	0	0	0	0		0	0	0	31.9
82	0	0	0	1		0	1	1	32.3
83	0	0	0	0		0	0	0	32.7
84	0	0	0	0		0	0	0	33.1
85	0	0	0	0		0	0	0	33.5
86	0	0	0	0		0	0	0	33.9
87	0	0	0	0		0	0	0	34.3
TOTALS:	30	16	3	7		33	23	56	

Appendix R. Released Steelhead by Year Class and Sex, Return Year 1999.

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**Sawtooth Fish Hatchery (195; (15n))**

<b>Males -</b>	2-year old -	27 (1n)	<b>Females -</b>	2-year old -	26 (3n)
	3 or 4-year old -	5 (2n)		3 or 4-year old -	6 (4n)
	<b>Total -</b>	<b>32 (3n)</b>		<b>Total -</b>	<b>32 (7n)</b>

**East Fork (6; (6n))**

<b>Males -</b>	2-year old -	8 (2n)	<b>Females -</b>	2-year old -	1 (1n)
	3 or 4-year old -	3 (1n)		3 or 4-year old -	6 (6n)
	<b>Total -</b>	<b>11 (3n)</b>		<b>Total -</b>	<b>7 (7n)</b>

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n = natural fish

No fish were released at the Slate Creek trap.

Appendix S. Sawtooth Fish Hatchery Criteria for Aging Steelhead, from Kent Ball, The Department

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<b>"A-run" male -</b>	≤ 68 cm - 2-year old
	> 68 cm - 3 or 4-year old
<b>"A-run" female -</b>	≤ 65 cm - 2-year old
	> 65 cm - 3 or 4-year old
<b>"B-run" male -</b>	≤ 73 cm - 2-year old
	> 73 cm - 3 or 4-year old
<b>"B-run" female -</b>	≤ 68 cm - 2-year old
	> 68 cm - 3 or 4-year old

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Submitted by:

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